This listing of claims will replace all prior versions and listings of claims in the application.

Listing of Claims:

1. (currently amended) Method of operating a direct-injection, four-stroke, internal combustion engine including a variable volume combustion chamber defined by a piston reciprocating within a cylinder between top-dead center and bottom-dead center points and an intake valve and an exhaust valve controlled during repetitive, sequential exhaust, intake, compression and expansion strokes of said piston comprising:

providing to the combustion chamber during an intake event a first fraction of fuel of about 10 to about 50 percent of a total controlled auto-ignition combustion cycle fuel requirement;

providing to the combustion chamber during the intake event fresh air and engine exhaust gas; and,

providing to the combustion chamber during a compression event a second fraction of fuel of about the difference between the total controlled auto-ignition combustion cycle fuel requirement and said first fraction of fuel.

2. (original) Method of operating a direct-injection, four-stroke, internal combustion engine as claimed in claim 1 wherein said first fraction of fuel is injected about 0 to about 90 degrees after exhaust stroke top dead center.

3. (original) Method of operating a direct-injection, four-stroke, internal combustion engine as claimed in claim 1 wherein said second fraction of fuel is injected about 20 to about 60 degrees before the compression stroke top dead center.

4. (original) Method of operating a direct-injection, four-stroke, internal combustion engine as claimed in claim 1 wherein said first fraction of fuel is injected about 0 to about 90 degrees after exhaust stroke top dead center and further wherein said second fraction

of fuel is injected about 20 to about 60 degrees before the compression stroke top dead center.

5. (original) Method of operating a direct-injection, four-stroke, internal combustion engine as claimed in claim 1 wherein said intake event is characterized by a sub-atmospheric pre-combustion pressure condition within the combustion chamber.

6. (original) Method of operating a direct-injection, four-stroke, internal combustion engine as claimed in claim 1 wherein said engine exhaust gas is provided by external recirculation apparatus.

7. (original) Method of operating a direct-injection, four-stroke, internal combustion engine as claimed in claim 1 wherein said engine exhaust gas is provided via exhaust valve control.

8. (original) Method of operating a direct-injection, four-stroke, internal combustion engine as claimed in claim 7 wherein said exhaust valve control comprises trapping exhaust gas within the combustion chamber during the exhaust stroke.

9. (original) Method of operating a direct-injection, four-stroke, internal combustion engine as claimed in claim 7 wherein said exhaust valve control comprises rebreathing exhaust gas into the combustion chamber during the intake stroke.

10. (currently amended) Method of operating a direct-injection, four-stroke, internal combustion engine including a variable volume combustion chamber defined by a piston reciprocating within a cylinder between top-dead center and bottom-dead center points and an intake valve and an exhaust valve controlled during repetitive, sequential exhaust, intake, compression and expansion strokes of said piston comprising:

controlling the exhaust valve and intake valve to establish a sub-atmospheric pressure condition within the combustion chamber during the intake stroke;

injecting into the combustion chamber during an intake stroke a first fraction of fuel of a total controlled auto-ignition combustion cycle fuel requirement;

controlling the exhaust valve and intake valve to provide to the combustion chamber during the intake stroke fresh air and engine exhaust gas; and,

injecting into the combustion chamber during a compression stroke a second fraction of fuel of about the difference between the total controlled auto-ignition combustion cycle fuel requirement and said first fraction of fuel.

11. (currently amended) Method of operating a direct-injection, four-stroke, internal combustion engine as claimed in claim 10 wherein the first fraction of fuel comprises about 10 to about 50 percent of the total controlled auto-ignition combustion cycle fuel requirement.

12. (original) Method of operating a direct-injection, four-stroke, internal combustion engine as claimed in claim 10 wherein said first fraction of fuel is injected about 0 to about 90 degrees after exhaust stroke top dead center.

13. (original) Method of operating a direct-injection, four-stroke, internal combustion engine as claimed in claim 10 wherein the first fraction of fuel comprises about 10 to about 50 percent of the total combustion cycle fuel requirement and further wherein said first fraction of fuel is injected about 0 to about 90 degrees after exhaust stroke top dead center.

14. (original) Method of operating a direct-injection, four-stroke, internal combustion engine as claimed in claim 10 wherein the second fraction of fuel is injected about 20 to about 60 degrees before the compression stroke top dead center.

15. (original) Method of operating a direct-injection, four-stroke, internal combustion engine as claimed in claim 11 wherein the second fraction of fuel is injected about 20 to about 60 degrees before the compression stroke top dead center.

16. (original) Method of operating a direct-injection, four-stroke, internal combustion engine as claimed in claim 12 wherein the second fraction of fuel is injected about 20 to about 60 degrees before the compression stroke top dead center.

17. (original) Method of operating a direct-injection, four-stroke, internal combustion engine as claimed in claim 13 wherein the second fraction of fuel is injected about 20 to about 60 degrees before the compression stroke top dead center.

18. (currently amended) Method of operating a direct-injection, four-stroke, internal combustion engine including a variable volume combustion chamber defined by a piston reciprocating within a cylinder between top-dead center and bottom-dead center points and an intake valve and an exhaust valve controlled during repetitive, sequential exhaust, intake, compression and expansion strokes of said piston comprising:

establishing a cylinder charge insufficient for <u>controlled</u> auto-ignition within the combustion chamber by

providing a sub-atmospheric pre-combustion pressure condition within the combustion chamber during an intake stroke of the cylinder,

injecting a first fraction of fuel into the combustion chamber such that said first fraction of fuel is resident during the sub-atmospheric pre-combustion pressure condition, and

providing air and recirculated exhaust gases into the combustion chamber, and

enriching the cylinder charge by injecting a second fraction of fuel into the combustion chamber during a compression stroke of the piston sufficient to cause controlled auto-ignition of the enriched cylinder charge.

19. (original) Method of operating a direct-injection, four-stroke, internal combustion engine as claimed in claim 18 wherein said sub-atmospheric pressure condition within the combustion chamber reaches at least about 42 kPa sub-atmospheric.

20. (original) Method of operating a direct-injection, four-stroke, internal combustion engine as claimed in claim 18 wherein said sub-atmospheric pressure condition within the combustion chamber terminates not earlier than about 75 degrees past exhaust stroke top dead center.

21. (original) Method of operating a direct-injection, four-stroke, internal combustion engine as claimed in claim 18 wherein said sub-atmospheric pressure condition within the combustion chamber reaches at least about 42 kPa sub-atmospheric and terminates not earlier than about 75 degrees past exhaust stroke top dead center.

22. (currently amended) Method of operating a four direct-injection, four-stroke, internal combustion engine as claimed in claim 18 wherein the first fraction of fuel comprises about 10 to about 50 percent of a total controlled auto-ignition combustion cycle fuel requirement and the second fraction of fuel comprises about the difference between the total controlled auto-ignition combustion cycle fuel requirement and the first fraction of fuel.

23. (original) Method of operating a four direct-injection, four-stroke, internal combustion engine as claimed in claim 18 wherein said first fraction of fuel is injected about 0 to about 90 degrees after exhaust stroke top dead center.

24. (original) Method of operating a four direct-injection, four-stroke, internal combustion engine as claimed in claim 18 wherein said first fraction of fuel is injected about 0 to about 90 degrees after exhaust stroke top dead center and further wherein said second fraction of fuel is injected about 20 to about 60 degrees before the compression stroke top dead center.

25. (original) Method of operating a direct-injection, four-stroke, internal combustion engine as claimed in claim 18 wherein said recirculated exhaust gases are provided by external recirculation apparatus.

26. (original) Method of operating a four direct-injection, four-stroke, internal combustion engine as claimed in claim 18 wherein said recirculated exhaust gases are provided via exhaust valve control.

27. (original) Method of operating a direct-injection, four-stroke, internal combustion engine as claimed in claim 26 wherein said exhaust valve control comprises trapping exhaust gases within the combustion chamber during the exhaust stroke.

28. (original) Method of operating a direct-injection, four-stroke, internal combustion engine as claimed in claim 26 wherein said exhaust valve control comprises rebreathing exhaust gases into the combustion chamber during the intake stroke.